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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,798	02/01/2001	Douglas Duane Coolbaugh	BUR920000143US1(13890)	8546

7590

11/28/2003

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EXAMINER

FARAHANI, DANA

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/773,798

Applicant(s)

COOLBAUGH ET AL.

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 5) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 6) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 9, 13, 14, 15, and 18, are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitter Prior Art (AAPA), previously cited, in view of Klersy et al. (U.S. 5,177,567), hereinafter Klersy, and further in view of Sedra and Smith (a book, Microelectronic circuits), previously cited.

Regarding claims 1, 9, 14, 15, and 18, AAPA discloses in figure 1 a method of providing a heterojunction bipolar transistor structure comprising at least an underlying SiGe base region 22, an insulator layer 26 formed on surface portions of the underlying SiGe base region, and an emitter 28 formed on the insulator layer and in contact with the underlying SiGe base region through an emitter opening formed in the insulator layer, the emitter, the insulator layer and the SiGe base region each having exposed sidewalls; and siliciding exposed silicon surfaces of at least the emitter and the SiGe base region.

AAPA does not disclose forming a passivation layer on the exposed sidewalls of the emitter, the insulator layer and portions of the SiGe base region.

Klersy teaches at column 10, lines 30-34, that a passivation layer protects the structure in which it is used, and further prevents short-circuiting. Therefore, it would

have been obvious to one of ordinary skill in the art at the time the invention was made to form passivation layer on exposed sidewalls of the emitter, the insulator layer, and portion of the base region to protect those layers, and further isolate the emitter and the base contacts so there would be no shorts between base and emitter, so the transistor could be usable in a variety of applications, since it is well known in the art that a transistor in order to be usable in a variety of applications it should not have a shorted circuit between the base and the emitter (see Sedra and Smith, page 223, figure 4.2).

Regarding claim 13, AAPA discloses patterned insulator 26 of figure 1. However, AAPA does not disclose multiple patterned insulator layers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple insulator layer since mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

3. Claims 2 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Hasegawa and further in view of Sedra and Smith as applied to claim 1 above, and further in view of Misium et al., hereinafter Misium (U.S. Patent 6,331,492), newly cited.

AAPA in view of Hasegawa and further in view of Sedra and Smith renders obvious the claimed invention, as discussed above, except for expressly disclosing the passivation layer is formed by CVD. Misium teaches that CVD is a well known, advantageous deposition method. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use CVD at the condition the applicant

discloses, since it is known in the art CVD under those conditions is used to deposit layers in a semiconductor device and results in uniformity of the deposited layer.

4. Claims 3, 4, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Hasegawa and further in view of Sedra and Smith as applied to claim 1 above, and further in view of Nguyen et al. (U.S. Patent 4,987,102), hereinafter Nguyen, previously cited.

AAPA in view of Hasegawa, and Sedra and Smith, renders obvious the claimed invention, as discussed above, except for the passivation layer being made of nitride, oxide, and oxynitride, or any combination thereof. Nguyen discloses at column 5, line 30 that nitride is formed to be used in the semiconductor industry. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use these materials, specifically nitride, as the passivation layer since it is known in the art that these layers are used as passivation layer and nitride, for example, has good adhesive properties.

5. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Hasegawa, and Sedra and Smith, as applied to claim 9 above, and further in view of Vora (U.S. Patent 4,757,027), previously cited.

AAPA in view of Hasegawa, and Sedra and Smith renders obvious the claimed invention, as discussed above, except for an intrinsic emitter. Vora discloses at column 6, lines 36-47, an intrinsic emitter is formed in a transistor. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use intrinsic emitter so there would be no need for adding impurities to the emitter.

6. Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Hasegawa, and Sedra and Smith as applied to claim 9 above, and further in view of Van Zeijl (U.S. Patent 6,268,779), previously cited.

AAPA in view of Hasegawa, and Sedra and Smith renders obvious the claimed invention, as discussed above, except for a SiO₂ insulator.

Van Zeijl discloses at column 2, lines 52-53, that SiO₂ is used as an insulating layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use this material as the passivation layer of AAPA, since it is the most widely used insulator in the semiconductor IC industry.

Response to Arguments

7. Applicants' arguments filed 8/25/03 have been fully considered but they are not persuasive.

8. Applicants mainly argue that the primary reference, AAPA, fails to teach or suggest a permanent conformal passivation layer formed on the exposed sidewalls of the emitter. Applicants also argue that the Klersy reference does not teach or suggest a bipolar transistor structure including a permanent conformal passivation layer positioned on the exposed sidewalls of an emitter, and the reference device is far removed from applicants' bipolar transistor. First, note that AAPA is not relied upon to reject the limitation of the conformal passivation layer on the exposed sidewalls of the emitter. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413,

208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The three references, namely, AAPA, Klersy, and the book by Sedra and Smith are all used to make the rejection of the pertinent claims. Second, Klersy is cited to show that the use of passivation layer on the exposed surfaces of electronic devices is known in the art. The device in Klersy is a solid-state electronic device. It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the switching device in Klersy is close enough to the Applicants' claimed invention in regard to the use of a passivation layer. Passivation layers in solid-state electronic devices are normally used, either for protection or insulation; and the Klersy reference is cited to merely show this and the structure therein is not combined in any way to that of AAPA.

In response to applicants' argument that Klersy fail to disclose silicide formation, note that AAPA discloses this, as discussed in the above rejections.

In response to applicants argument that the passivation layer in the Klersy reference is not formed on the exposed regions of the device, note that the limitation of forming the passivation layer on the "exposed surface" is rendered obvious by a combination of the three references. That is Sedra and Smith is cited to show that a bipolar transistor is not normally shorted between its base, emitter, and collector. Therefore, if AAPA were to be modified such that there would be no short between the emitter region and the base region (in figure 1), the emitter region on the top inevitably

would have had exposed surfaces (in the absence of the silicide regions). Therefore, the limitation of "exposed surface" is implicitly shown by the references, and it naturally follows in light of a combination of the three references.

In response to applicants' argument that there is no motivation to modify the prior art structure, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one of ordinary skill in the art would have recognized the fact that a bipolar transistor when is shorted between any of its terminals, then the transistor is not usable in many applications. Similarly, it is so well known in the art that passivation layers are widely used as protection or insulating layers in semiconductor devices. Therefore, a motivation does not need to explicitly stated in the references when the reason to combine the references are obvious to one of ordinary skill in the art.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

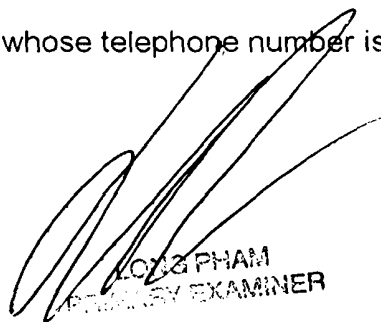
TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D. Farahani
November 22, 2003



LOIS PHAM
PATENT EXAMINER